Chu Xin (Cloris) Cheng

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EDUCATION

California Institute of Technology   Pasadena, CA
B.S. Computer Science   *Sep. 2021 – Jun. 2025*

- **Current GPA**: 4.3
- **Relevant Coursework**: Data Mining and Machine Learning [**TA**, 2023 & 2024] (CS 155), Learning Systems (CS 156a), Statistical Inference [**TA**, 2023] (CS 157), Advanced Topics in Machine Learning (CS 159), Applied Linear Algebra (ACM 104), Introductory Methods of Computational Mathematics (ACM 106a), Introduction to Probability Models [**TA**, 2023] (ACM 116), Stochastic Processes and Regression (ACM 118), Mathematical Optimization (ACM 122).

LIST OF PUBLICATIONS

Improving sample efficiency of high dimensional Bayesian optimization with MCMC
Zeji Yi[*], Yunyue Wei[*], Chu Xin Cheng[*], Kaibo He, Yanan Sui
Under review at *Learning for Dynamics & Control Conference* (L4DC), 2024. (arXiv)

Preferential Bayesian Optimization with Multiple Mixed Objectives
Raul Astudillo, Kejun Li, Maegan Tucker, Chu Xin Cheng, Aaron Ames, Yisong Yue
Under review at *International Conference on Artificial Intelligence and Statistics* (AISTATS), 2024.

WORK AND RESEARCH EXPERIENCES

Machine Learning Researcher, Yisong Yue's Group   2022 - 2024
California Institute of Technology / Lawrence Livermore National Lab

- Conducted research on the application and generalization of Bayesian optimization methods for learning from preference feedback within the dueling bandits framework, with an extension to continuous space utilizing Gaussian processes. Developed an algorithm that incorporates Langevin dynamics and Kalman filtering on the posterior distribution of the Gaussian process to directly integrate gradient feedback.
- Engaged in research on Pareto frontier exploration for multiobjective optimization, specifically in the context of preference feedback and its application to exoskeleton gait optimization. Explored various methods leveraging Gaussian processes with variational inference to approximate intractable posteriors. Integrated scalarization methods in multiobjective optimization with Bayesian optimization algorithms to ensure sufficient exploration along the Pareto front. **Workshop paper** at ICML 2023 (link).
- Investigated applying conformal prediction to graph data in protein engineering using Graph Neural Networks for experiment design and bias-correction.

Summer Undergraduate Research Fellowship   2022
California Institute of Technology / Tsinghua University

- Research on high-dimensional sampling using Bayesian optimization with Gaussian processes, specifically focused on its application in spinal stimulation. Employed Markov chain Monte Carlo techniques and Langevin dynamics to efficiently sample from intractable posteriors and devised an algorithm capable of maintaining an adaptive mesh on a high-dimensional action space.

Machine Learning Researcher, Rigorous Systems Research Group   2022 - 2024
California Institute of Technology

- Reseach focused on optimization and control, particularly in the realm of online policy selection. Investigated the generalization of optimization algorithms to nonlinear dynamical systems with non-convex reward functions.

Intern, Tencent (Tencent Xinghuo Program)   2021 - 2022
Shenzhen, Tencent Quantum Lab

- Reproduced quantum approximate optimization algorithm using Tensorflow and Qiskit. Studied quantum information and quantum computation with focus on algorithms such as Grover search and variational algorithms.

Extracurricular Experiences

Competitions Expert, Kaggle 2021 - 2022

Online

- Sartorius - Cell Instance Segmentation: Top 4%, Rank 46/1505.   Computer vision contest for object detection. Used popular frameworks such as Mask R-CNN and libraries such as MMDetection and Detectron2.
- Feedback Prize - Evaluating Student Writing: Top 8%, Rank 159/2058.   NLP contest for text segmentation and classification. Used models such as Transformer, BERT, ELMo.

Technical Skills

Languages: Python, Swift, MATLAB.

ML Packages: PyTorch, TensorFlow, Pandas, SciPy.